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Test 1419: International 5088 Diesel 18-Speed

Tractor Museum
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NEBRASKA TRACTOR TEST 1419 — INTERNATIONAL 5088 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1005 rpm)								
136.12 *(101.50)*	2400	8.888 *(33.645)*	0.450 *(0.274)*	15.32 *(3.017)*	185 *(85.0)*	53 *(11.7)*	75 *(23.9)*	28.943 *(97.737)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
121.46 *(90.57)*	2518	8.468 *(32.055)*	0.480 *(0.292)*	14.34 *(2.825)*	184 *(84.4)*	53 *(11.7)*	75 *(23.9)*	....
0.00 *(0.00)*	2671	3.278 *(12.409)*	....	....	182 *(83.3)*	53 *(11.7)*	75 *(23.9)*	....
62.66 *(46.73)*	2598	5.842 *(22.114)*	0.643 *(0.391)*	10.73 *(2.113)*	183 *(83.9)*	53 *(11.7)*	76 *(24.2)*	....
136.27 *(101.62)*	2400	8.890 *(33.652)*	0.450 *(0.274)*	15.33 *(3.020)*	186 *(85.6)*	52 *(11.1)*	75 *(23.9)*	....
31.85 *(23.75)*	2640	4.606 *(17.436)*	0.997 *(0.606)*	6.91 *(1.362)*	182 *(83.3)*	52 *(10.8)*	74 *(23.3)*	....
92.61 *(69.06)*	2560	7.105 *(26.895)*	0.529 *(0.322)*	13.03 *(2.568)*	184 *(84.4)*	53 *(11.4)*	76 *(24.2)*	....
Av 74.14 ***Av (55.29)***	**2564**	**6.365** ***(24.094)***	**0.592** ***(0.360)***	**11.65** ***(2.295)***	**184** ***(84.2)***	**53** ***(11.4)***	**75** ***(23.9)***	**28.910** ***(97.625)***

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 9th (M3) Gear											
116.19 *(86.65)*	8611 *(38.31)*	5.06 *(8.14)*	2400	3.19	8.780 *(33.234)*	0.521 *(0.317)*	13.23 *(2.607)*	180 *(82.2)*	54 *(11.9)*	68 *(20.0)*	28.805 *(97.270)*
75% of Pull at Maximum Power—Ten Hours 9th (M3) Gear											
97.36 *(72.60)*	6748 *(30.02)*	5.41 *(8.71)*	2547	2.66	8.083 *(30.598)*	0.572 *(0.348)*	12.04 *(2.373)*	176 *(80.1)*	40 *(4.3)*	44 *(6.4)*	28.887 *(97.547)*
50% of Pull at Maximum Power—Two Hours 9th (M3) Gear											
66.78 *(49.80)*	4510 *(20.06)*	5.55 *(8.94)*	2594	1.95	6.748 *(25.544)*	0.696 *(0.424)*	9.90 *(1.949)*	178 *(80.8)*	36 *(2.2)*	38 *(3.3)*	28.595 *(96.560)*
50% of Pull at Reduced Engine Speed—Two Hours 13th (H1) Gear											
66.87 *(49.87)*	4517 *(20.09)*	5.55 *(8.94)*	1559	1.95	4.861 *(18.402)*	0.501 *(0.305)*	13.76 *(2.710)*	178 *(80.8)*	37 *(2.8)*	39 *(3.9)*	28.610 *(96.612)*
MAXIMUM POWER IN SELECTED GEARS											
99.26 *(74.02)*	14960 *(66.55)*	2.49 *(4.00)*	2510	14.30	5th (L5) Gear			178 *(81.1)*	45 *(7.2)*	55 *(12.8)*	28.730 *(97.017)*
114.17 *(85.14)*	14357 *(63.86)*	2.98 *(4.80)*	2398	8.56	6th (L6) Gear			178 *(81.1)*	45 *(7.2)*	54 *(12.2)*	28.760 *(97.118)*
119.92 *(89.42)*	12217 *(54.34)*	3.68 *(5.92)*	2399	5.23	7th (M1) Gear			180 *(81.9)*	51 *(10.6)*	62 *(16.7)*	28.860 *(97.456)*
120.49 *(89.85)*	10310 *(45.86)*	4.38 *(7.05)*	2399	4.05	8th (M2) Gear			180 *(81.9)*	50 *(10.0)*	60 *(15.6)*	28.870 *(97.490)*
121.17 *(90.36)*	8986 *(39.97)*	5.06 *(8.14)*	2399	3.32	9th (M3) Gear			180 *(81.9)*	52 *(11.1)*	64 *(17.8)*	28.840 *(97.388)*
120.56 *(89.90)*	7559 *(33.63)*	5.98 *(9.62)*	2398	2.74	10th (M4) Gear			180 *(82.2)*	52 *(11.1)*	63 *(17.2)*	28.850 *(97.422)*
119.01 *(88.75)*	6402 *(28.48)*	6.97 *(11.22)*	2399	2.41	11th (M5) Gear			179 *(81.7)*	46 *(7.8)*	54 *(12.2)*	28.880 *(97.523)*
117.22 *(87.41)*	5340 *(23.75)*	8.23 *(13.25)*	2400	1.91	12th (M6) Gear			179 *(81.7)*	48 *(8.9)*	57 *(13.9)*	28.880 *(97.523)*

LUGGING ABILITY IN 9th (M3) GEAR

Crankshaft Speed rpm	2399	2159	1924	1677	1432	1196
Pull—lbs *(kN)*	8986 *(39.97)*	10381 *(46.18)*	11373 *(50.59)*	11589 *(51.55)*	10894 *(48.46)*	10201 *(45.38)*
Increase in Pull %	0	16	27	29	21	14
Power—Hp *(kW)*	121.17 *(90.36)*	125.10 *(93.28)*	121.42 *(90.54)*	107.61 *(80.25)*	86.79 *(64.72)*	68.12 *(50.79)*
Speed—Mph *(km/h)*	5.06 *(8.14)*	4.52 *(7.27)*	4.00 *(6.44)*	3.48 *(5.60)*	2.99 *(4.81)*	2.50 *(4.03)*
Slip %	3.32	3.97	4.45	4.76	4.29	3.97

Department of Agricultural Engineering

Dates of Test: November 12-December 8, 1981

Manufacturer: INTERNATIONAL HARVESTER COMPANY 401 North Michigan Avenue, Chicago, IL 60611

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.3 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8276 **Fuel weight** 6.891 lbs/gal *(0.826 kg/l)* **Oil SAE** 30 **API service classification** CD/SE **To motor** 4.127 gal *(15.622 l)* **Drained from motor** 3.775 gal *(14.291 l)* **Transmission and final drive lubricant** IH Hytran fluid **Total time engine was operated** 73.5 hours.

ENGINE: Make International Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 437TT2U128248* **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.30″ × 5.00″ *(109.2 mm × 127.0 mm)* **Compression ratio** 15.4 to 1 **Displacement** 436 cu in *(7145 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard with duals **Serial No.** 2540002U000872* **Tread width** rear 62″ *(1575 mm)* to 124″ *(3150 mm)* front 60″ *(1524 mm)* to 84″ *(2134 mm)* **Wheel base** 111.6″ *(2835 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.8″ *(706 mm)* Vertical distance above roadway 39.0″ *(991 mm)* Horizontal distance from center of rear wheel tread 0″ *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.4 *(2.3)* second 1.7 *(2.7)* third 1.9 *(3.1)* fourth 2.3 *(3.6)* fifth 2.6 *(4.2)* sixth 3.1 *(5.0)* seventh 3.7 *(5.9)* eighth 4.3 *(7.0)* ninth 5.0 *(8.0)* tenth 5.8 *(9.4)* eleventh 6.8 *(10.9)* twelfth 7.9 *(12.8)* thirteenth 8.2 *(13.3)* fourteenth 9.7 *(15.6)* fifteenth 11.1 *(17.9)* sixteenth 13.1 *(21.0)* seventeenth 15.2 *(24.4)* eighteenth 17.8 *(28.7)* reverse 2.8 *(4.4)*, 3.2 *(5.2)*, 3.7 *(6.0)*, 4.4 *(7.0)*, 5.1 *(8.1)*, 6.0 *(9.6)* **Clutch** multiple wet disc operated by foot pedal with hydraulic power assist **Brakes** multiple wet disc hydraulically power activated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 145.5″ *(3.70 m)* left 145.5″ *(3.70 m)* (on concrete surface without brake) right 188″ *(4.78 m)* left 188″ *(4.78 m)* **Turning space diameter** (on concrete surface with brake applied) right 302″ *(7.68 m)* left 302″ *(7.68 m)* (on concrete surface without brake) right 387.1″ *(9.83 m)* left 387.1″ *(9.83 m)* **Power take-off** 1005 rpm at 2400 engine rpm and 540 rpm at 2428 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	Bias dB(A)	Radials dB(A)
Maximum Available Power—Two Hours	78.5	78.0
75% of Pull at Maximum Power—Ten Hours		78.5
50% of Pull at Maximum Power—Two Hours		78.5
50% of Pull at Reduced Engine Speed—Two Hours		74.5
Bystander in 18th (H6) gear		85.0

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 9th (M3) Gear											
114.14 *(85.11)*	9214 *(40.99)*	4.65 *(7.48)*	2399	6.76	8.925 *(33.784)*	0.539 *(0.328)*	12.79 *(2.519)*	178 *(81.1)*	49 *(9.2)*	57 *(13.9)*	28.885 *(97.540)*
MAXIMUM POWER IN SELECTED GEARS											
100.42 *(74.88)*	13571 *(60.37)*	2.77 *(4.47)*	2509	14.59	6th (L6) Gear			177 *(80.6)*	40 *(4.4)*	52 *(11.1)*	28.820 *(97.320)*
110.88 *(82.68)*	12969 *(57.69)*	3.21 *(5.16)*	2399	13.36	7th (M1) Gear			179 *(81.7)*	36 *(2.2)*	42 *(5.6)*	29.010 *(97.962)*
116.41 *(86.80)*	10993 *(48.90)*	3.97 *(6.39)*	2399	8.56	8th (M2) Gear			178 *(81.1)*	37 *(2.8)*	43 *(6.1)*	28.990 *(97.895)*
118.46 *(88.34)*	9573 *(42.58)*	4.64 *(7.47)*	2397	6.79	9th (M3) Gear			178 *(81.1)*	39 *(3.9)*	44 *(6.7)*	28.930 *(97.692)*
118.17 *(88.12)*	7996 *(35.57)*	5.54 *(8.92)*	2400	5.40	10th (M4) Gear			177 *(80.6)*	38 *(3.3)*	45 *(7.2)*	28.950 *(97.760)*
115.84 *(86.38)*	6695 *(29.78)*	6.49 *(10.44)*	2398	4.43	11th (M5) Gear			176 *(79.7)*	39 *(3.9)*	45 *(7.2)*	28.950 *(97.760)*
114.88 *(85.66)*	5600 *(24.91)*	7.69 *(12.38)*	2399	3.58	12th (M6) Gear			178 *(81.1)*	39 *(3.9)*	45 *(7.2)*	28.940 *(97.726)*
115.45 *(86.09)*	5408 *(24.06)*	8.00 *(12.88)*	2399	3.51	13th (H1) Gear			175 *(79.4)*	39 *(3.9)*	44 *(6.7)*	28.940 *(97.726)*

LUGGING ABILITY IN 9th (M3) GEAR

Crankshaft Speed rpm	2397	2161	1921	1688	1437	1205
Pull—lbs *(kN)*	9573 *(42.58)*	10962 *(48.76)*	12190 *(54.22)*	12563 *(55.88)*	11823 *(52.59)*	11088 *(49.32)*
Increase in Pull %	0	15	27	31	24	16
Power—Hp *(kW)*	118.46 *(88.34)*	120.01 *(89.49)*	116.26 *(86.70)*	103.02 *(76.83)*	84.26 *(62.83)*	67.51 *(50.34)*
Speed—Mph *(km/h)*	4.64 *(7.47)*	4.11 *(6.61)*	3.58 *(5.76)*	3.08 *(4.95)*	2.67 *(4.30)*	2.28 *(3.67)*
Slip %	6.79	8.49	10.27	12.23	10.40	8.77

REPAIRS and ADJUSTMENTS: The thermostat malfunctioned at the start of the 50% load drawbar test. It was removed, checked and reinstalled and the test rerun.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 141°F *(60.8°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1419.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

International 5088 Diesel

TIRES, BALLAST AND WEIGHT		Radial Ply Tires: With Ballast	Radial Ply Tires: Without Ballast	Bias Ply Tires: With Ballast	Bias Ply Tires: Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Inner two 18.4R38; 8; 12 *(85)* Outer two 18.4R38; 6; 12 *(85)*	Inner two 18.4R38; 8; 12 *(85)* Outer two 18.4R38; 6; 12 *(85)*	Inner two 18.4-38; 8; 12 *(85)* Outer two 18.4-38; 6; 12 *(85)*	Inner two 18.4-38; 8; 12 *(85)* Outer two 18.4-38; 6; 12 *(85)*
Ballast	—Liquid (each inner)	None	None	355 lb *(161 kg)*	None
	—Test equip. (each)	40 lb *(18 kg)*	None	40 lb *(18 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None	None	None
	—Test equip. (each)	40 lb *(18 kg)*	None	40 lb *(18 kg)*	None
Height of Drawbar		20.5 lb *(520 mm)*	20.5 in *(520 mm)*	19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator—Rear		12200 lb *(5534 kg)*	12040 lb *(5461 kg)*	12490 lb *(5665 kg)*	11620 lb *(5271 kg)*
	—Front	4050 lb *(1837 kg)*	3970 lb *(1801 kg)*	4050 lb *(1837 kg)*	3970 lb *(1801 kg)*
	—Total	16250 lb *(7371 kg)*	16010 lb *(7262 kg)*	16540 lb *(7502 kg)*	15590 lb *(7072 kg)*

The Agricultural Experiment Station
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